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INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

REAL-TIME GEOSPATIAL DATA VIEWER (RETIGO)

AN EPA-DEVELOPED WEB-BASED TOOL FOR RESEARCHERS AND CITIZEN SCIENTISTS TO EXPLORE THEIR AIR MEASUREMENTS

Screenshot showing RETIGO in action, where data are displayed on a map and in one of the chart options.

A new tool for data visualization

Air measurement instruments are becoming less costly and more portable. An emerging method of collecting air measurements in real time is by using wearable sensors or placing instruments on bicycles, vehicles or other moving platforms. This is allowing more people to learn about their local air quality.

Research groups in universities and government are using mobile monitors to study how local sources affect air quality, such as changing pollution levels near major highways, rail yards, ports or industrial complexes. Community members interested in their local air quality trends are using similar citizen science-based methods, such as carrying portable instruments to map air quality trends locally. However, after the data are collected, technical hurdles may exist to explore and analyze the measurements. There is a growing interest in visualizing data by plotting it on a map so that the measurements can be more easily and effectively analyzed. This is where RETIGO can help.

What is RETIGO and why was it created?

RETIGO is designed to reduce technical barriers to explore geospatial air data over time and space. The program is publically available and designed to be easy to use for both professional researchers and citizen scientists.

What do we gain by using RETIGO?

RETIGO is a “plug and play” type tool that enables users to input large and complex data such as pollution concentrations, wind speed and other meteorological conditions, time of day, and location (global positioning). They can then plot the data on a map and on several graph options to observe trends. For example, data may be collected by people wearing air sensors who walk a given route in a community. RETIGO enables users to learn about sources of pollutants; where pollutant levels may be higher,

what happens to pollutants during windy days and when air pollutants may be higher than other times, among other factors.

How does RETIGO help me explore my data?

RETIGO has a data import page to upload air measurement data. Once your data are uploaded, you can overlay the data on a map, plot as a function of time, and also plot as a function of distance to location you select on the map (e.g., a highway). If your data has multiple pollutants measured, you can toggle between pollutant types measured to change what is displayed on the map and graphs. If you want to focus on data collected for part of the mapped area, you have an option to manually draw a box on the map to isolate only the location of interest.

When I upload my data, is it being stored by RETIGO or the EPA?

Neither. RETIGO runs entirely on your local browser. Your data never leaves your computer and are not uploaded to the EPA server. When you are done using RETIGO, close the browser and the data are only available in your local computer memory.

Does RETIGO allow me to bring in any other data for exploration?

When you import your data, you can opt to obtain a summary of meteorological conditions identified by the World Meteorological Organization that are retrieved from the nearest weather station and automatically set to match your sampling period. You can also choose to import particulate matter or ozone data from regulatory stations, retrieved through AirNow, a multi-agency online service by EPA and others that offers air quality data and the Air Quality Index.

What if I have a very large data set, such as over 200,000 measurements?

RETIGO can handle it. The program will easily import small and very large data sets. Since seeing so many data points on a map at the same time can create a very crowded map, the tool gives you options to view the data in blocks of 1,000 points or choose to have the data time-averaged to reduce to a maximum of 1,000 averages shown.

How do I have to format my data to use RETIGO? Does it have to be a certain time resolution?

RETIGO uses a simple and flexible data format – a space or comma delimited file that includes your data time and location (latitude, longitude), and allows for a flexible amount of other numeric variables such as measured pollutants, walking or driving speed, and others. RETIGO has a module that helps you format your time to an international standard. The data do not need to be of any set time resolution to use RETIGO – the program just looks for a time and location to plot the data on maps and graphs.

Where can I learn how to use RETIGO?

A video tutorial and step-by-step instructions are available, which provide information on how to format and upload data; how to use the various plotting and mapping functions; and how to export data for other analyses. You can find these resources on the project website: http://www.epa.gov/hesc/real-time-geospatial-data-viewer

Does RETIGO only work for certain locations?

RETIGO is built upon the Google Maps API and therefore can display data over any area in the world that are shown on Google Maps. The satellite image resolution, access to street-level images, and availability of nearby AirNow or meteorological data will vary from one location to another.

LEARN MORE

RETIGO website, with tutorials and access to the data visualization tool: http://www.epa.gov/hesc/real-time-geospatial-data-viewer

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November 2014